

More Powered Mobility Training ; How to, with what, where, when, and why?
Closing the Gap, 2007
By Karen M. Kangas OTR/L
Seating and Positioning Specialist, Assistive Technology Specialist, Clinical Educator
R. R. 1, Box 70, Shamokin, PA 17872
570-644-1032; FAX; 570-644-1502; Email: kmkangas@ptd.net

Introduction:

To obtain a powered chair for anyone in the past, it was believed that requirements included specific prerequisite cognitive and motor skills. However, with today's assistive technology of seating and programmable mobility systems all children can become functionally independent in their mobility. Changing these attitudes, obtaining the new knowledge, using appropriate equipment, and learning how to teach mobility will all be discussed with real cases.

It is critical to consider all young children and individuals with cognitive deficits treated in therapy as candidates for powered mobility. In the past therapists evaluated the need for powered mobility on the basis of an arbitrary hierarchy. This assessment regarded the individual as "ready & capable" or "not ready & not capable." This hierarchy focused solely on the "presumed" attributes (or lack of flexibility of the attributes) and function of the powered wheelchairs rather than any "presumed" need for mobility of the individual. In short, a hierarchy of children's prerequisite "readiness" skills was developed in direct response to the lack of flexible powered chair systems. The individual child was then "judged" rather than the equipment's limitations .

This hierarchy appeared to exist in contradiction to accepted standards of practice of rehabilitation. The strong emphasis of treatment of independent ambulation did include functional mobility and early on included the use of manual wheelchairs. It was a foundation of standard practice to recognize that ambulation and functional mobility were critical. In fact, occupational and physical therapists were the first professional groups to be looking towards adaptive equipment and treatment techniques which would assist children in mastering mobility.

However, when it came to powered mobility, this same standard of practice did not apply, it was not considered to be a viable treatment technique or even standard adaptive equipment. It was a "last resort" and only for those children who could prove in advance "readiness" skills.

With the technology available today within powered chairs, the focus of "readiness" must change. The need for more bold and courageous treatment must include each child's ability to gain independent mobility through the use of power. This assumption then precludes that all previously held biases towards age, cognitive characteristics, or physical disabilities when considering a child as a candidate for power change. The only prerequisite to power now is the child's desire to be mobile.

In this session, I will demonstrate how powered mobility is both a treatment technique and adaptive equipment necessary for independent mobility (ambulation). It must be utilized as a standard of practice so that children can develop independent mobility.

Teaching Powered Mobility, not Driving:

Not only did we establish hierarchies of readiness, we also developed without thinking, I might add, methods of teaching, based on "driving."

We thought that giving someone a powered chair was most like giving them a car, and we proceeded to teach them as we were taught to drive. And when and how were we taught to drive? First of all, we were already experienced ambulators, and experienced hand users, and experienced task accomplishes. We came to driving with a rich past, and a capable, competent body. We had already mastered a bicycle, many riding toys, skating, dancing, and running. We also came with great desire, for the independence of control. Our teachers, however, came to this situation with great trepidation. They knew how much a "crash" could entail, not only in expense, but in dangerous bodily harm. Their primary job, was to try and ensure SAFE control.

In order to do that, they took the student and a vehicle to an open unfamiliar parking lot. The student was then taught some of what skills might be needed before approaching the environment to be managed, the ROAD. In this environment braking, turning, stopping short, starting quickly, looking

both ways, all of this was considered. Windy roads, control of staying on the right, keeping the eyes forward, but also in the rear view mirror, all was emphasized.

The real skills needed were these: when the student entered the car, they were to maneuver it from a stopped position onto a path which would lead to a specific place. Once on the path, the car must stay on the right, (while the driver is on the left) and an imaginary line is picked with the eyes, between two lines, a middle line, and a side line, on the road. While the foot is pushing on an accelerator, and the hands, in view, are on a steering wheel, stay straight, but watch all around you. Read landmarks, and street signs, and watch carefully. Watch all other drivers, but never let your eyes leave the road. Keep your hands on the wheel, and pay attention. Watch where you are going. Don't go too fast. Don't go too slowly. Always be safe.

Now, let's consider an infant and toddler learning to walk. Do we set up cones and teach them right and left? Do we tell them to watch where you are going? Do we make them walk only on the right side? Do we instruct them the entire time they are walking, and do we stand over them, hovering, and instructing every moment? Do we insist that they walk over to us, first, and then on a predetermined pathway, we think is good? I am afraid if we did do this, no child would have walked.

When teaching a child to ride a bicycle, are the same strategies used? Do we take them between cones? Do we tell them to look out, look behind, watch out? No, we stand with them, we work with them when both of us are ready to work, we work for short periods of time, and we hold onto the bicycle, making sure that the bicycle is managed, and the child is assured by our very presence, that they will not fall, and that the bicycle is under control. The child then slowly begins to take control as we allow it. We give up control as we see the child managing the bicycle.

First and foremost we need to understand how to teach mobility. To a child who has never had control of their body before, this powered chair is going to be her first experience at observing and moving independently within her environment, far more like "legs" than a "car." We need to encourage her and teach her as if she were learning to walk, using some strategies of teaching equipment like we would in teaching a bicycle.

We need totally change our approach in teaching driving to children. It must much more resemble the support required for ambulation, but with interests of exploration. The powered chair to a young child, is a first form of independent mobility, walking some of the time. We must give up many of our ideas, past strategies and understandings of how we used powered chairs with adults. Our children are not going out by themselves onto a road, or off to work. Our children are learning to move.

These principles must be taken into consideration.

1. Everyone must have independent mobility
2. All human beings are created to utilize mobility
3. Powered mobility is one method of mobility, but if in use for an individual whose never had experience with any independent mobility, it is far more like ambulation than other mobility
4. All children and all parents will not like powered chairs
5. Powered chairs are used when they are desired, make them desirable
6. Powered mobility, is situational, experiential, and successful if presented adequately
7. Always start with already "going" not "hope to go"
8. Seating for Task Performance, Adequate pre-programming of chair's performance, adequate environment (oriented, if possible), short period of time, and interesting visual experiences, with NON-directive support from adult
9. Familiar environment, use of small spaces, parents first
10. Immediate success and independent control
11. Control of Speed
12. Going and stopping, vs. forward (Turning, circling), seeing the familiar environment by looking behind you and all around the place
13. Switch site/access
14. Forward Direction
15. No reverse at first

Assessment of Seating and Positioning for Access

- 1. Adequate Adaptive Seating which supports a Task Performance Position**
 - a. Use of planar seating
 - b. EZ back
 - c. Plastazote “barrier” vest
 - d. Pelvic weightbearing
 - e. No straps, (except when looking at children with dystonia, then “judicious” strapping)
- 2. The Myth of:**
 - a. Consistency/Reliability of Switch Access
 - b. Instead, create opportunities for experience
- 3. Head vs. Hand switch access**
- 4. Equipment Needed**
 - a. Electronic switches, not mechanical ones
 - b. Programmable electronics, multiple drives, remote programmer
 - c. Tilt? Not too much, only for “head droppers” or if no other seating available
 - d. Two chairs
 - e. Joystick last
 - f. Visual display, not visible

Training/Treatment Required

- 1. No chaotic, large rooms (like gym or parking lot)**
- 2. No directed verbal commands, create an interesting environment**
- 3. Work in familiar environments**
- 4. Forward used very close to walls in hallway**
- 5. Time needed ; Give time for child to use, but don’t spend whole session too long**
- 6. Environments to be trained in; choose carefully**
- 7. Strategies to include**
 - a. Never crashing
 - b. Managing doorways later, how to teach
 - c. Experience, experience, experience
- 8. Later Methods Needed for increased competence**
 - a. Practice drills
 - b. Activity for forward
 - c. Wandering/Strolling
 - d. Risk taking/unpredictability
- 9. Using multiple methods of access**
 - a. Indoor, school maneuverability
 - b. Outdoor wandering, exploring
 - c. Managing sidewalks, malls, hikes

Summary

The use of alternative switch accesss initially with children in powered chairs has really allowed an observable, easy progression, controlled by them, from the very beginning, to become ultimately, extremely successful. Many children progress easily, quickly, and readily to a joystick. Others do not, but rather continue to progress to developing and using multiple switches for access, and manage various environments. Some individuals can only manage familiar environments, but as they grow, can extend the number of familiar environments.

Who is a successfully trained child? Who is independently mobile? Independence must mean that the child is doing the act by all by herself. However, the level of independence varies greatly. If a child were able to drive a chair on a walk around the neighborhood, and her mother did not have to push her, and even if that child only controlled one switch which was forward, with the mother still responsible for the stops and turns, is this child independent? To me, the answer is affirmative. Yes, this child is independent at this task. Her mother can walk beside her, she is not pushing her, and the child is controlling the chair, independently. If a child could only do this, would this make her a candidate for

powered mobility? To me, the answer is a resounding; Yes, yes, yes! I once thought this simple activity would be enough, but I am happy to say that I have not yet met a child who has stopped here.

In closing, a lot more time could be spent on how the assessment process works, training strategies which have proven to be successful, and equipment which is preferred. In a few pages, this is impossible. Instead, as therapists, please think and try various types of mobility with children.

Remember, it is the point of delivery at which treatment really begins. Training is treatment. Use will define change, and functionality. Training must occur within the individual's environment. It should never be a "weekly" training, but rather sessions, more infrequent, but over a longer period of time. The system ordered needs to be flexible to allow for change in use, and change in demand, both in seating, access, and chair performance.

Treatment and training need to come from reaction rather than control, expecting our children to tell us what they need and want, and by providing them with rich, and satisfying, successful experiences. Providing them with patience, and supporting them with faith in their own abilities to explore, and be curious is a greater gift. Wait for them to request what they need, wait before telling them how to use the equipment. Recognize that supporting an individual's own relationship with independence and subsequent mobility, is the task, not teaching an individual how to drive.

Continue to observe that mobility and the control of mobility is an interaction which provides opportunities for competence. Continue to promote the use of assistive technology, and to remember that powered mobility is crucial. Without independent mobility, it is difficult to interact. Without independent mobility it is almost impossible to be included. Remember that mobility is an inherent human desire, and trust it to show itself.

Configuring Powered Mobility Systems for Children(Paper Presented International SeatingSymposium,2004)

The Times have changed.

Today we have equipment with accompanying assistive technology which was never before available. This equipment on powered chair bases includes: 1). programmable, 2). alternative switch access especially, electronic zero-pressure switches, and 3). flexible, customized seating.

This equipment, is often under-utilized or not applied adequately to support independent control of powered mobility for children with complex needs.

The Configuration of the Chair and the Training has not changed.

With the times changing, and completely different equipment available, it is important to note that how training for powered mobility occurs, has not changed. Training continues to consist of teaching driving skills as would be developed and utilized by adults who have acquired disabilities and who have already been ambulatory, mobile, bicyclists, skaters, runners, jumpers, climbers, and automobile drivers.

Using new equipment which will allow children who have never been mobile in any way, (and certainly not ambulatory), in short, who are very inexperienced with mobility, require completely different training strategies to be successful.

We must teach mobility first, encouraging independent control, before "driving skills" can be taught. We must work within familiar environments for initial mobility, not large parking lots and gymnasiums, or wide hallways, which are completely unfamiliar to the child. We must program and set up the equipment to allow the child to safely explore and learn the use of the equipment in direct control of the environments within which they live and learn.

Instead, we create a "driving environment" as if we were teaching children to drive an automobile, we overly control the situation, constantly demanding the child to listen and obey our commands. This method of learning may be helpful when a machine like a car is being taught to be responsibly managed, but it is certainly not helpful when attempting to teach a child to "walk" and for children with complex needs, "walking" and "mobility" is what they need to learn, not driving.

The Physical Configuration of the Chair needed.

In order to support learning mobility, not driving, the physical configuration of the chair must support independent control and mobility. The configuration must suit and be planned to work for both the child and the trainer.

For the Trainer:

The visual display needs to be mounted in the rear stably, and within an easy viewing of the trainer. The trainer must know the programmability of the chair, and its current "modes." The child will not and should not be expected to manage a chair before she has even experienced making it go where she wants. The switch controller interface must also be mounted initially in a convenient spot for the trainer's access. The trainer must turn on the chair, and the switches, so that the child can experience immediately control of moving the chair.

The chair's On/off switch is initially controlled by the trainer. Even the reverse switch of the chair may need to be initially controlled by the trainer. Why? The child must experience movement, and control of the chair within a familiar environment. From that experience, the child will develop increased desire, attention, and competence to extend her learning to include management of the chair and the activity.

The child must first experience successful mobility, and independent control of it, before the child can be expected to be interested in learning responsible use of the machine parts of the chair. If mobility is encouraged, and supported, the child will naturally develop increased abilities, and interests. The chair, due to its programmability, and the equipment's flexibility can be adjusted and change with the child. The child's own learning can be supported by this programmability, and competence and use of the chair can expand as experience increases.

The Programming of the Chair required.

Standby and standby modes should not be programmed or used when a child is first learning mobility. These modes are not needed, and constantly interfere with the child's understanding of the consistency of actions of the chair.

No seat functions should be programmed, nor should re-set be programmed. The chair should simply drive, drive slowly, and stop. There should be no menu to follow, no waiting to occur, except for the turning on/off and set up by the trainer.

The speeds needs to be set very slowly, imitating the speed of an initial stepping toddler. However, the chair still needs to perform, so torque or the power level needs to be adjusted to allow the chair to move efficiently over carpeting, or door sills.

Speed and turning deceleration and acceleration must be adequately programmed. Most of the time the switch's actions should be immediately responsive, with no delays. Acceleration and deceleration are only needed when the child can manage increased speeds and multiple environments.

The Physical Configuration needed for the child to experience mobility.

Seating for task performance is the the foundation for independent control of the chair. This is seating which does not control tone, nor is it the seating needed for safe, passive transport. This is seating which allows the child to manage her own body, use tone, and allows for pelvic stability and mobility. This seating is often radically different than the seating needed by the child for the child to be managed. Now, the child is to manage herself.

This may often require the armrests to be removed, the legrests to be removed, the chest supports to be removed, and the seat and back angles may need to be radically altered to support a more upright, yet forward posture. Positions of task performance are critical in independent control. These are positions of pelvic weight bearing, and support. Using seating which has controlled the child, is not going to support the child in controlling herself.

The training session must be short, and as the child's own patterns of independent control are observed, the seating can be increasingly supportive of independent control.

Digital control of the chair, particularly with head switches can be considered a starting point, instead of proportional control with a hand. Most children who are considered to have complex needs, have difficulty with tone management or motor coordination. A joystick can make a chair move, but controlling it is another completely different scenario. Managing both speed and direction can confuse a young child, or a child who has never experienced mobility. Using digital control, a switch always and only performs one task, and it is always consistent and reliable. This allows a child to quickly and automatically expect the switch to perform a particular way, allowing the child to develop a natural expectation of the activity.

Switch placement must allow immediate success and control. Zero pressure switches can be extremely helpful here, as the child must only control his range of motion, and not have to coordinate that range with strength. Managing range and strength (or coordination) is already difficult, and can be

eliminated with initial training strategies. Success and control, especially control of stop, happens naturally with children when real independence is available. This allows the foundation of safe management of the chair as competence increases with experience.

Attendant control should never be used to manage a chair while a child is learning. Attendant control is for management of the chair when the child is not in the chair. When the child is either headed for trouble, or the adult is anxious about the chair and child's location, the adult trainer needs to turn the chair off, and disengage the chair, move the chair, explain to the child why this activity was stopped. Then, the trainer can start the chair up again, giving the child an experience of time and understanding as to how the difficulty arose. Crashes should not be experienced, the trainer is there to prevent them. Safety is the responsibility of the adult trainer, as the child is learning to "walk." We certainly do not allow toddlers to run out in the street, and we do not expect them to not run out after we tell them once. We remain with toddlers all the time, expecting them to not know rules, to learn to manage their bodies as they learn and experience activity. This same method of support and supervision must occur for powered mobility training.

How the child will learn.

All children (and adults) learn motor control and postural control through the development of routines. All learning has sensory motor components, and so far, we have paid far too much attention to the motor components, ignoring the sensory integration required to act, and repeat an act. All human beings, not just children, learn by process. This process becomes a routine which is an activity which can be anticipated. The anticipation is the ability to know what will be required to perform the activity, and the knowledge of the beginning, the middle, and the end of the activity. To develop routines, practice which is moderately novel must occur.

Increasing the frequency of the activity, rather than the duration, is how routines develop. Allow the activity to not be managed by an arbitrary longer length of time expecting endurance, but rather allow the activity to be repeated, ended, and eventually expanded.

React to the child's actions, rather than directing the child. If we directed all toddlers as they began to move, they would stop moving. Instead, we naturally support them emotionally. If they stop moving, we presume they intended to stop. So, also, must we support children who are developing experience with powered mobility. React to them, keep them safe, presume every action was intentional. When the chair and its programming and configuration are set up adequately, these actions of the child will be obvious, and under her control. Independence will be evident, although at first, fragile, in that it is not of a long duration, nor always able to be reproduced. However, if the child's actions are not obvious, and appear to be confused, or erratic or inconsistent, then, the chair is inadequately programmed, or the seating has been inadequately conceived.

When will real success and real independence be achieved.

It is surprising how children with complex needs must meet expectations higher than ever expected of children with simple needs. Can any child's skills be predicted or anticipated? Can any adult's? No. Only an environment of support and curiosity can be provided to allow a child to demonstrate interest, and competence. Will every child who is in a powered chair be able to manage every unfamiliar environment efficiently? No, but then no child of any age, nor any adult of any age can manage every unfamiliar environment efficiently. However, all of us are able to demonstrate adequate and functional independent control as our personalities and experience and desire allow. Children with complex needs are no different. Some will learn quickly, and learn a lot, some will learn quickly, but only perform in some situations. All will demonstrate independent actions, and control in some environments. We can both tell you that, because it happens with the children we work with, every day, in all situations.

Strategies for the inexperienced or slower learner

1. Always using two chairs, manual then powered; even in lesson.
2. In manual chair, go to task starting point, transfer here, and end here
3. Anticipation, routine, and practice
4. Task related, of INTEREST to the learner
5. FORWARD is a walk, TURNING one way only, Turning is looking behind you or around the room, can also have two turns, but no forward

6. Slow speed, short time working/frequent breaks
7. One direction or two as primary control with consistent speed
8. Reverse is not used
9. OUTSIDE performance controlled by teacher/therapist/adult
10. INSIDE performance
11. DOORWAYS, leaving first, entering last
12. Daily practice at school OR at home, NOT both, first
13. From ten minutes, add distance and sequence to task from transfer point, NOT new parameters of chair itself.
14. Each level of independence is a "stretch" of previous lesson. Each task will allow more independence "built in"
15. WHEN are 3 switches added? WHEN reverse?
WHEN control of ON/OFF?
16. Teacher always present, and prevents crashes
17. Confidence Building for all ADULTS and STUDENTS in environment;
by observing only competence; belief in competence of driver
18. No crashes ever
19. Lessons monthly or bimonthly, competence in 12-18 months.

Strategies for the quick learner

1. Task related; short sessions with multiple repetitions, a break
2. Different speeds for indoor & outdoor; different speed of turns vs. speed of forward
3. Initial training regarding control of chair itself, outside/driveway
4. Multiple repetitions/"scales of the piano"; a motor sequence to be repeated, with at least 3 variables (for interest and control).
5. Smooth surfaces for control initially
6. By second lesson, bumps/ edges, quick turns
7. Mastery of chair in all its parameters, speed, quick turns, slow turns, bumps
8. NO ECU; chair driving mastery first, then control of positions
9. Competency must always be evident, and planned
10. Do NOT instruct how to use in house, assign an area as homework, then return to analyze
11. Teaching each training session, performance by student first, "showing off", then next lesson is based on problem identified by student
12. Never any crashing
13. Training takes 3-10 lessons, over 3 weeks-2 months. Then 6 month follow-up.
Then Annual follow-up

Other issues to remember:

1. Stable placement (of access & seating) easier to learn, than constant changing
2. Training position may not even be best therapeutically initially
3. Success means person can initiate movement, & can release independently

Combining with other learning, e.g. communication aid

1. Teaching Modes, using visual display
2. Head control and its limits and advantages
3. Using different methods/different activities & combining them
4. Developing competence

Types of mobility

- A. Recreational/Social
 1. The JOY of movement
 2. Sharing the JOY, extending the JOY
- B. Cognitive/Educational
 1. Obtaining a forbidden treasure
 2. Getting away from "work"
- C. Functional

1. Autonomy's real home
2. Different in different environments

Environmental Control Units

What are they? Which to use? When to use?

Final Facts to Never Forget:

1. Mobility is self-controlled
2. Mobility is inherently rewarding
3. Mobility is a process and experience
4. Competence comes with risk
5. **THE ONLY SAFE IS STOP.**
6. Freedom is chaotic at first, then self-structured
7. Human beings are mobile, and are recognized by other human beings as human beings by their demonstration of task performance & competence
8. Mobility can be communicative but communication canNOT be mobile
9. Consistency is based on anticipation, and personal motivation, NOT on repetition and motor practice
10. Individual is learning mobility, NOT driving
 - a. "Reverse" is not a real option, like for persons who were previously independently mobile with vehicles
 - b. Child's perceptions/conceptions are just beginning, not formulated yet
 - c. Adult's perceptions/conceptions based on own experiences of dependent movement & cognitive understanding of movement